

The development of a virtual patient e-module for wound management

Virtual patients (VPs) are an interactive computer-based clinical patient scenario used in medical education. Part one of this article, published in the last issue, discussed a literature search carried out to determine how VPs are used in medical education. Here, in part two, the author describes the development and application of a wound healing VP that has been integrated into the medical curriculum at Cardiff University Medical School. The e-module, which was designed based on learning outcomes, balances core content and interactivity with questions engage the reader and promote the application of conceptualised ideas. There is scope to distribute the module to other healthcare students and professionals.

KEY WORDS

- ▶▶ E-learning
- ▶▶ Case-based learning
- ▶▶ Computer assisted case-based learning
- ▶▶ Interactive patient scenarios
- ▶▶ Medical education
- ▶▶ Virtual patient

Cardiff University Medical School introduced “C21”, a case-based learning curriculum in September 2013. A key aspect to C21 is a spiral curriculum that has case-based learning at its heart. Cardiff University adopted this approach to achieve greater integration of basic and clinical sciences (Cardiff University, 2017). As part of a year-4 student-selected component module at Cardiff University, it was felt that there were aspects of wound healing that could be taught via multimedia to healthcare students of all year groups utilising the case-based learning approach.

The aim of developing this wound healing VP was to integrate the e-module into the medical curriculum at Cardiff University. Its application may be relevant during student attachments in geriatrics, dermatology and general medicine. There is also scope to distribute the module to other healthcare students and professionals.

AMBIGUITY AND OPPORTUNITY

There is ambiguity across the board with respect to definitions and understanding of what case-based learning and virtual patients (VPs) comprise. This makes it difficult to assess the quality of VPs from the literature, as the title “virtual patient” encompasses vastly different levels of sophistication and technology. This provides an opportunity to explore the terminology used and distinguish

technology types utilised in the provision of VPs. There is therefore a prospect of a clearer evidence-base to be established for each technology type to be used in medical education.

THE VIRTUAL PATIENT E-MODULE

After reviewing the learning outcomes set by the medical school and the General Medical Council, a VP e-module was developed focussing on the assessment and management of chronic leg wounds. The visualisation board in *Figure 1* describes the key content explored in the VP module. The learning objectives for this module are given in *Box 1*.

The structure of the module is based upon the learning outcomes set out by the Medical School for each year group. The module comprises of three linear-interactive cases, following Mrs Pinkman (venous leg ulcer, see *Figures 1* and *2*),

Box 1. Learning objectives to be achieved from following the chronic wound module.

- ▶▶ Describe the four principles of wound healing
- ▶▶ Elicit an appropriate history to determine the aetiology of chronic wounds
- ▶▶ Assess physical signs of venous and arterial disease
- ▶▶ Interpret the results from investigations commonly performed in chronic wound management
- ▶▶ Formulate an appropriate diagnosis and management plan for venous and arterial ulcers

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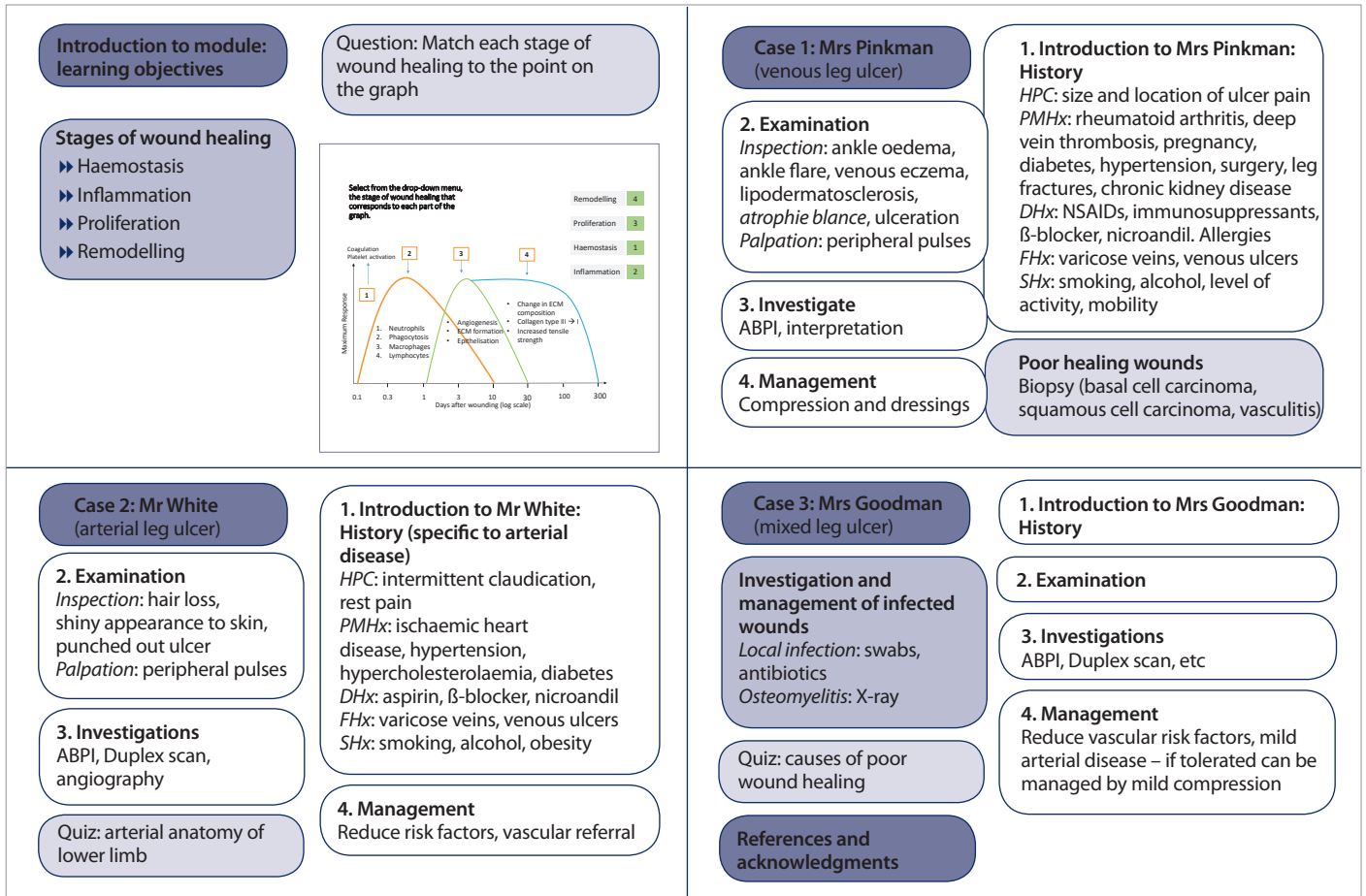


Figure 1. Visualisation board illustrating the key content explored in the virtual patient model. ABPI = ankle-brachial pressure index; HPC = History of Presenting Complaint; PMHx = Past Medical History; DHx = Drug History; FHx = Family History; SHx = Social History

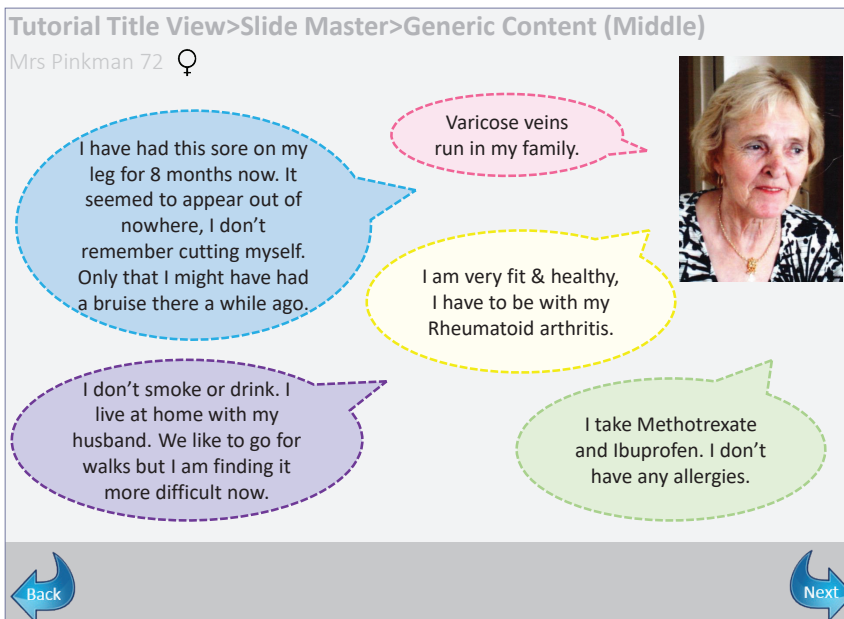


Figure 2. Introduction to Mrs Pinkman (Case 1) – venous leg ulcer

Mr White (arterial leg ulcer) and Mrs Goodman (mixed leg ulcer). A spiral approach was taken throughout the virtual cases, encompassing aspects of anatomy, physiology, radiology and clinical practice that relate to aspects of wound healing and chronic leg wound management. The patient cases have been designed to guide the reader through the processes of taking a relevant history, focussed examination, requesting and interpreting relevant investigations and appropriately managing leg ulcers of different aetiologies.

Questions are interspersed throughout the module to engage the reader and promote the application of conceptualised ideas (see Figure 3). The integration of questions into the delivery of the module was based on evidence that expert performance improves because of both increased experience and deliberate practice (Anders, 2004).

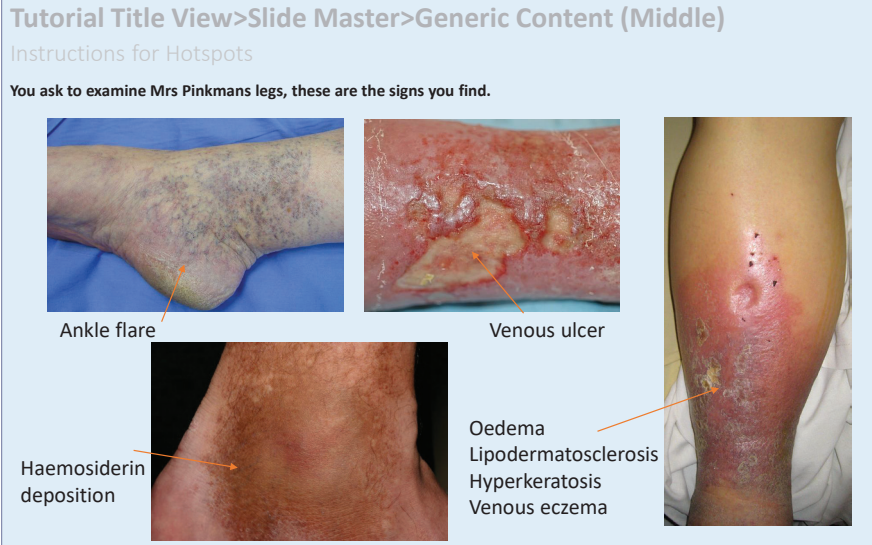


Figure 3. Examination of the skin with inspection for signs of venous leg disease

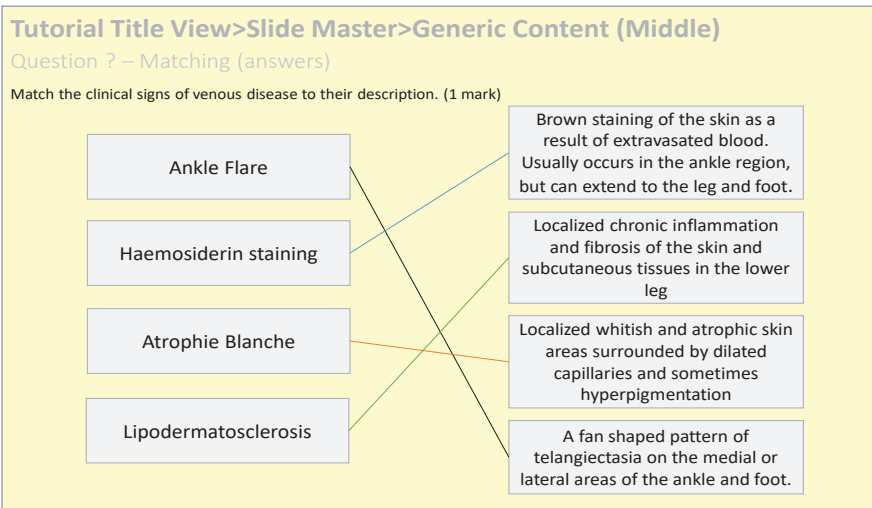


Figure 4. Example question from the e-learning module

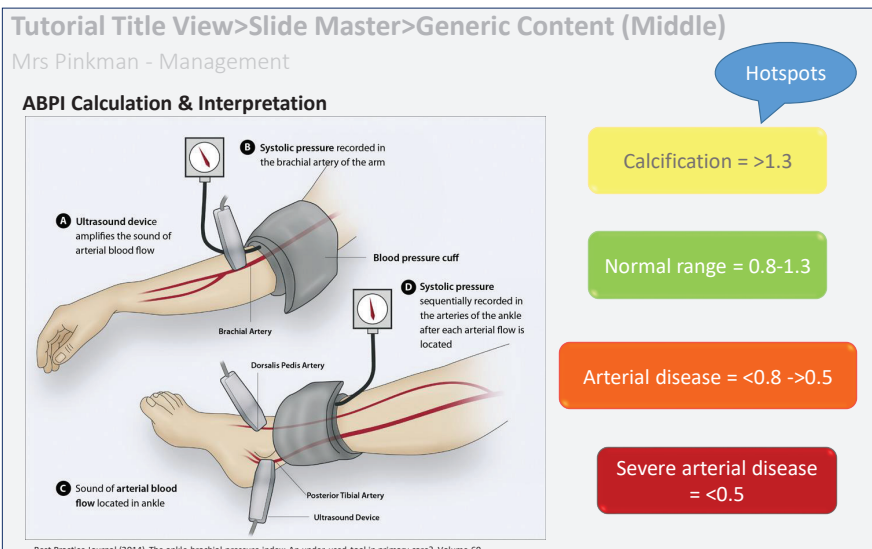


Figure 5. Investigation. Hotspots are interactive areas with additional information

Delivery of content and interactivity

The design of the module was carefully evaluated to balance the delivery of core content with a level of interactivity to keep the reader's interest without inhibiting the conceptualisation of the content. A pilot study conducted by Jäger et al (2014) looked at the influence of case design on students' perception and knowledge gained from using VPs. They concluded that students were spending 15 minutes on average working with a VP case. Strategic design is therefore important for efficient delivery of content and, based on this evidence, it was decided to split the content into three separate cases so users have a manageable amount of content to cover at a time. The visualisation of each slide was designed to be visually engaging and manageable, focussing the eye on the most relevant content. Figures 2–5 illustrate different components included within the chronic leg wound VP e-module.

CONCLUSION

VPs have been successfully integrated into medical curricula with positive results. They have been shown to be equally efficacious as traditional teaching methods but with additional applications. They are standardised and efficient medical resources that are widely accessible to recipients.

Specialities, such as wound healing, could benefit from the addition of VPs, as they can provide evidence-based patient cases that allow safe practise for students who may not get the exposure on placement. Research is needed, however, to explore the role of VPs in the delivery of wound care teaching and how this may be integrated within medical curricula.



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